Sample Problem #1

PROBLEM A5

PROBLEM STATEMENT

You have been commissioned to survey fractional Section 8, T4S, R6W as shown on the official plat on the facing page, which was approved on April 13, 1893. Your client has requested that all corners be monumented. (See diagram on next page)

PROBLEM REQUIREMENTS

1. Identify the method and the positions and/or monuments you would hold for control to establish each of the corners denoted as "a" through "f" below. No calculations are required.

    a. Southwesterly section corner

    b. Northwesterly corner of government Lot 2

    c. North corner common to government Lots 1 and 2

    d. Northeasterly corner of government Lot 1

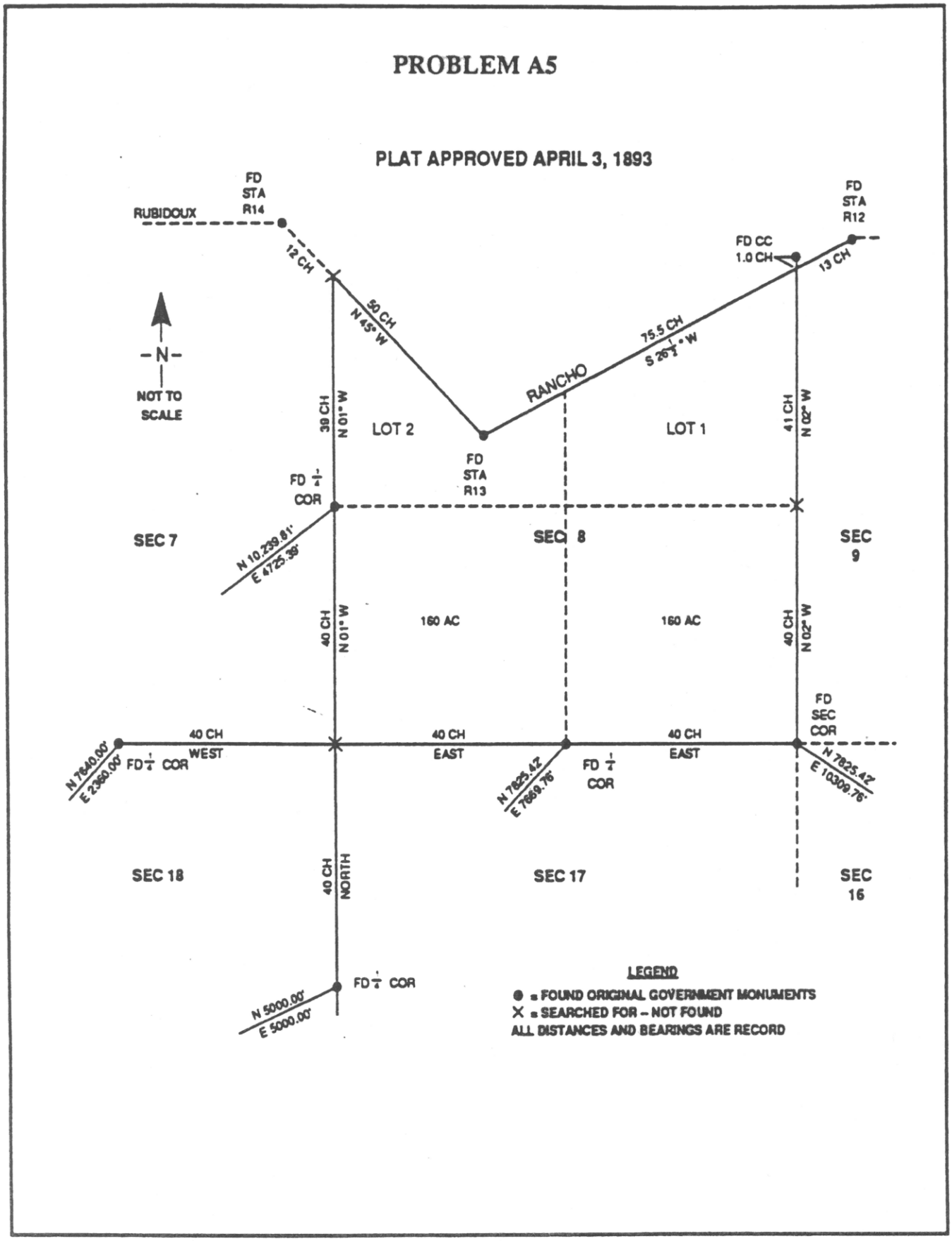
    e. East 1/4 corner

    f. Center 1/4 corner

2. Cite the section reference from the manual of instructions that verifies the method of establishing the corners.

3. Calculate the coordinates for the Southwesterly corner of Section 8. Show all work.

Sample Problem #1 (cont'd)



Sample Problem #2

PROBLEM B1

PROBLEM STATEMENT

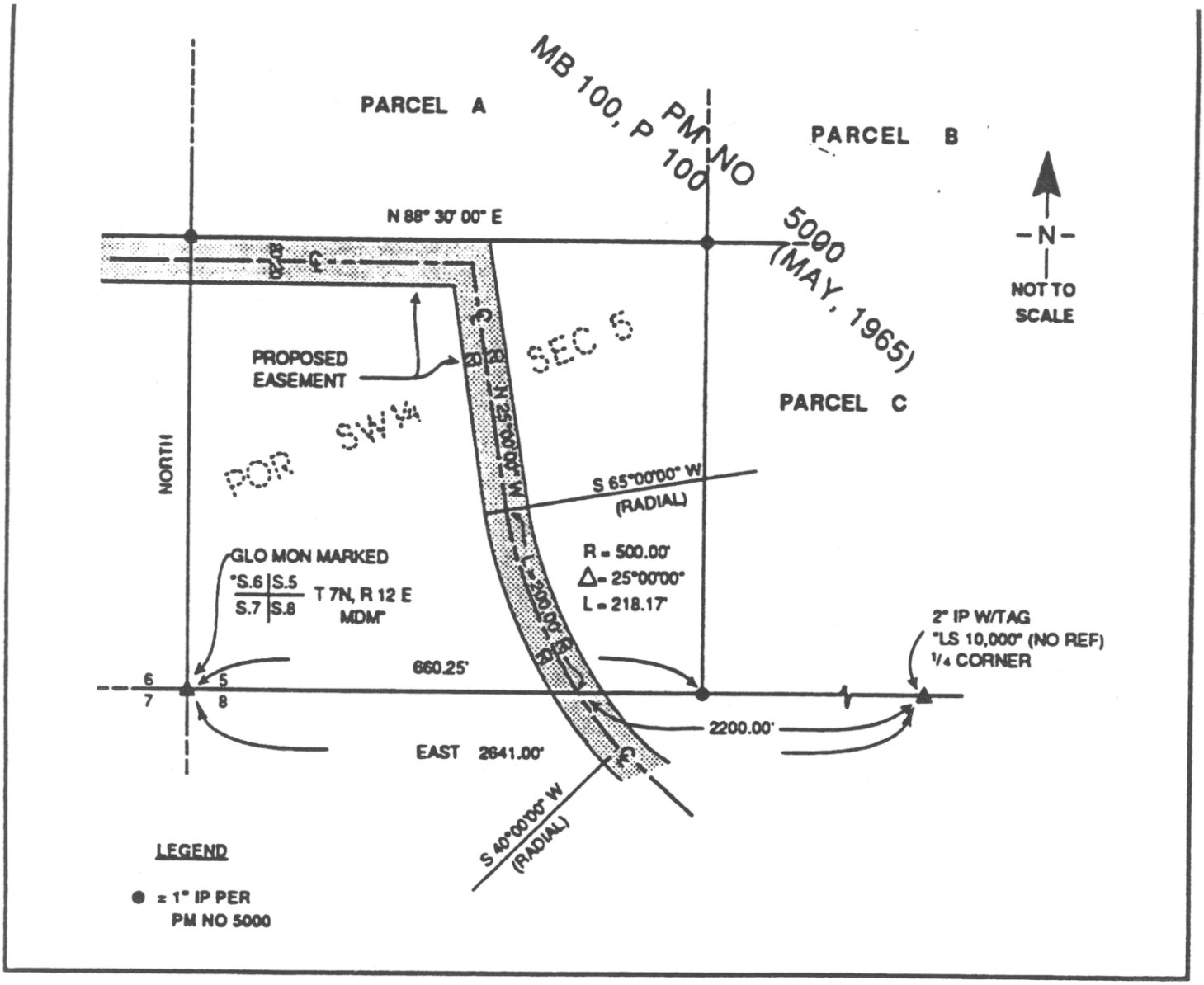
Your client owns a portion of the Southwest 1/4 of Section 5, T7N, R12E, M.D.M., and has provided you with the plat shown on the next page. You have been asked to prepare a legal description for a proposed easement 40 feet in width across your client's property.

PROBLEM REQUIREMENTS

1. Prepare a strip legal description, including caption (preamble) for the proposed easement.

   Begin your description at the Southwest corner of Section 5

   Use only the information provided on the plat. Make no assumptions



Sample Problem 2

Sample Problem #3

PROBLEM A3

PROBLEM STATEMENT

Your client owns Sections 9 and 16, and the Westerly 4,000 feet of Sections 10 and 15, T4S, R23W, S.B.M. You have been asked to provide horizontal and vertical control for the topographic mapping that is to be used for planning purposes. Vertical photography, taken with a 6" focal length camera on a 9" x 9" focal plane, is to be used. Analytical bridging is not to be considered.

The following factors control the project. **Make no assumptions.**

1. A 5' contour interval is required.

2. Model size is 3.6" x 7.0" for a single flight line and 3.6" x 6.3" for two or more adjacent flight lines.

3. The "C" factor to be used for this project is 1,800'.

4. The map is to be compiled at a 5 to 1 ratio.

5. The average terrain elevation is 2,500' above sea level.

6. The minimum target size to be used for premarking the ground is not to be less than 0.001" x 0.01" at the photo scale.

7. Per a recent Record of Survey, each section has been found to have standard dimensions.

PROBLEM REQUIREMENTS

1. Based on the above specifications, determine the following and **show all work**:

   a. The minimum number of flight lines required.

   b. The required flying height above sea level.

   c. The minimum number of models required.

   d. The minimum number of photographs required.

   e. The minimum number of horizontal and vertical control stations requiredto provide for adequate checks.

f. The negative scale.

g. The nominal map scale.

h. The minimum length and width of the target placed on the ground as a premark.

2. Give the accuracy requirements for each of the following based on the requirements of the National Map Accuracy standards:

a. Contours

b. Spot elevations

c. Planimetric features

Sample Problem 3 (Cont.)

Sample Problem #4

PROBLEM B3

PROBLEM STATEMENT

There are two methods by which azimuth can be determined by observations of the sun. Answer the following questions concerning these methods:

PROBLEM REQUIREMENTS

1. Name the two methods that can be used to determine azimuth by observations of the sun.

2. Which method is more accurate? Explain your answer.

3. The following two questions concern the method that uses vertical angle observations:

   a. How would inconsistencies of the angular (vertical and horizontal) observations be detected?

   b. How would calculations for the effect of the semi-diameter of the sun be eliminated?

4. For each method, indicate whether parallax and refraction are taken into account. Explain your answer.

5. When using the method that uses only the horizontal angle, what is the single most important area where errors, excluding time and angular measurements, would most likely occur?

6. What is an appropriate source for accurate time determination?

7. When using the method that uses only the horizontal angle, if observations are made on the trailing limb of the sun, how does that affect your angular calculations?

8. For each method, describe how the time of day of your observations affects azimuth determination.

9. For each method, describe how averaging your observations for calculation purposes would affect your final azimuth determination.